

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

Listing of Claims:

1. (Currently Amended) A DC motor, comprising:

a case;

a rotor unit which is rotatably arranged within the motor and includes a single hollow cylindrical field magnet fixed to holder means into which a rotating shaft is press-fitted at a center thereof, said cylindrical field magnet being magnetized such that [[S]]South and [[N]]North poles alternate with each other in a circumferential direction thereof; and

a stator unit which is circumferentially arranged around said rotor unit and is comprised of a ring arranged in the case and a plurality of stator yokes so arranged as to oppose said field magnet with a small gap, each of said stator yokes being formed by circumferentially stacking a large number of thin plates each of which constitutes a salient pole, and a plurality of coil units, each being formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes;

wherein the rotor unit includes a holder fitted at one end of the field magnet and a spring holder mounted at the other end of the field magnet, the spring holder being composed of a second holder fitted at the other end of the field magnet, a third holder and a spring sandwiched between the second holder and the third holder, and

wherein each of the [[S]]South and [[N]]North poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with a predetermined shift amount, boundaries between the [[S]]South poles and the [[N]]North poles being formed in a stepped shape in parallel with an axis of the rotating shaft.

2. (Original) A DC motor according to claim 1, wherein the shift amount of respective stages falls within a range of 12° to 50° in an electrical angle.
3. (Original) A DC motor according to claim 1, wherein a rotor position detection element is adjusted by $1/2$ the shift amount of respective stages.
4. (Original) A DC motor according to claim 1, wherein the motor is an inner rotor type brushless DC motor.
5. (Cancelled)
6. (Original) A DC motor according to claim 4, wherein the DC motor has three phases, eight poles and six stator units in which basic degree of a cogging torque thereof is 24.
7. (Cancelled)

8. (Currently Amended) A DC motor, comprising:

a case;

a rotor unit which is rotatably arranged within the motor and includes a single hollow cylindrical field magnet fixed to a holder to which a rotating shaft is coupled, said cylindrical field magnet being magnetized such that [[S]]South and [[N]]North poles alternate with each other in a circumferential direction thereof; and

a stator unit which is circumferentially arranged around said rotor unit and includes a ring arranged in the case and a plurality of stator yokes so arranged as to oppose said field magnet, each of said stator yokes including a large number of circumferentially-stacked thin plates each of which constitutes a salient pole, and a plurality of coil units;

wherein the rotor unit includes a holder fitted at one end of the field magnet and a spring holder mounted at the other end of the field magnet, the spring holder being composed of a second holder fitted at the other end of the field magnet, a third holder and a spring sandwiched between the second holder and the third holder, and

wherein each of the [[S]]South and [[N]]North poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with a predetermined shift amount, boundaries between the [[S]]South poles and the [[N]]North poles being formed in a stepped shape in parallel with an axis of the rotating shaft.

9. (Previously presented) The DC motor according to claim 8, wherein said rotating shaft is press-fitted at a center of said holder.

10. (Previously presented) The DC motor according to claim 8, wherein each of said coil units is formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes.
11. (Previously presented) The DC motor according to claim 8, wherein the shift amount of respective stages falls within a range of 12° to 50° in an electrical angle.
12. (Previously presented) The DC motor according to claim 8, wherein a rotor position detection element is adjusted by 1/2 the shift amount of respective stages.
13. (Previously presented) The DC motor according to claim 8, wherein the motor is an inner rotor type brushless DC motor.
14. (Cancelled)
15. (Currently Amended) The DC motor according to claim ~~[[8]]~~13, wherein the DC motor has three phases, eight poles and six stator units in which a basic degree of a cogging torque thereof is 24.

16. (Currently Amended) A DC motor, comprising:

a case;

a rotor unit which is rotatably arranged within the motor and including a rotating shaft press-fitted to a sleeve, a single tubular field magnet and holders arranged at both ends of said field magnet, wherein said sleeve is secured on a portion of an inner periphery of said field magnet, said field magnet being magnetized such that [[S]]South and [[N]]North poles alternate with each other in a circumferential direction thereof, each of the [[S]]South and [[N]]North poles having a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said cylindrical field magnet with a predetermined shift amount, wherein the rotor unit includes a holder fitted at one end of the field magnet and a spring holder mounted at the other end of the field magnet, the spring holder being composed of a second holder fitted at the other end of the field magnet, a third holder and a spring sandwiched between the second holder and the third holder; and

a stator unit which is circumferentially arranged around said rotor unit and is comprised of a ring arranged in the case and a plurality of stator yokes so arranged as to oppose said cylindrical field magnet with a small gap, each of said stator yokes being formed by circumferentially stacking a large number of thin plates each of which constitutes a salient pole, and a plurality of coil units, each being formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes.

17. (Cancelled)

18. (Previously presented) The DC motor according to claim 16, wherein the shift amount of respective stages falls within a range of 12° to 50° in an electrical angle.